



Big Hole Watershed Committee

Monthly Meeting Minutes

Wednesday, April 18, 2018 – 7:00 pm

Divide Grange – Divide, Montana

In Attendance

Tana Nulph, BHWC; Noah McMahon; Betty Bowler; Tom Bowler; Jim Olsen, FWP; Kim Snodgrass, Water & Environmental Technologies; Stephen Frazee, Water & Environmental Technologies; Craig Fellin, Outfitter; Eric Thorson, BHWC/Sunrise Fly Shop; Rutger Wilson, Sunrise Fly Shop; Andrew Barkley, Sunrise Fly Shop; Jessica Dhaemers, USDA Forest Service; Ben Cross; USFS Wise River; Bill Stoell; Mark Kambich, BHWC/Rancher; Hans Humbert, BHWC/Rancher; Craig Jones, Great Divide Outfitters; Bill Kempf, BHWC/Outfitter; Sierra Harris, TNC; John Jackson, BHWC/BVHD County Commission; JM Peck, Rancher; David Frederick, Ruby Springs Lodge; Paul Cleary, BHWC; Jeff Dunn, RESPEC; Jim Dennehy, BHWC/BSB Water; Randy Smith, BHWC/Rancher; Jacqueline Knutson, Kirwan Webb; FWP; Peter Frick, BHWC; Chris Edgington; Roy Morris, BHWC/GGTU; Ed Scott; Andy Suenram, BHWC; Robert Mahaney; and Liz Jones, BHWC/Rancher.

Introductions *Attendees introduced themselves.*

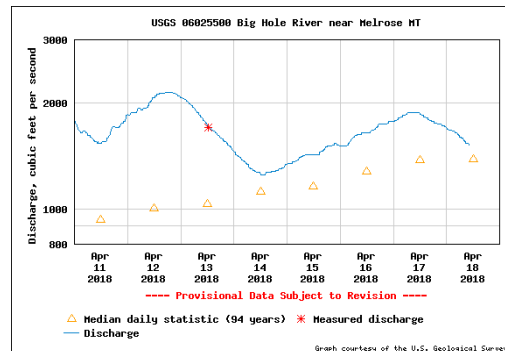
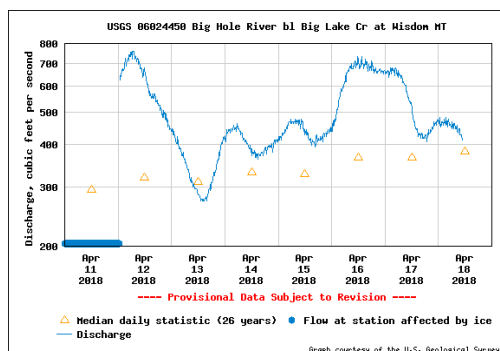
Meeting Minutes *March 2018 meeting minutes were reviewed, no additions or corrections.*

Reports

Streamflow/Snowpack Report – Jacqueline Knutson, Montana Fish, Wildlife and Parks

- *Streamflows:* Seasonal gages began reporting again in early April as ice broke up and are showing above average flows this past week likely in response to precipitation including some valley snowfall and with the amount of snowpack in the basin this year I expect flows to remain high through the runoff season. Saginaw bridge is not currently reporting because we have yet to be able to get up there to take a measurement and check the condition of the gage as winter conditions persist up high.

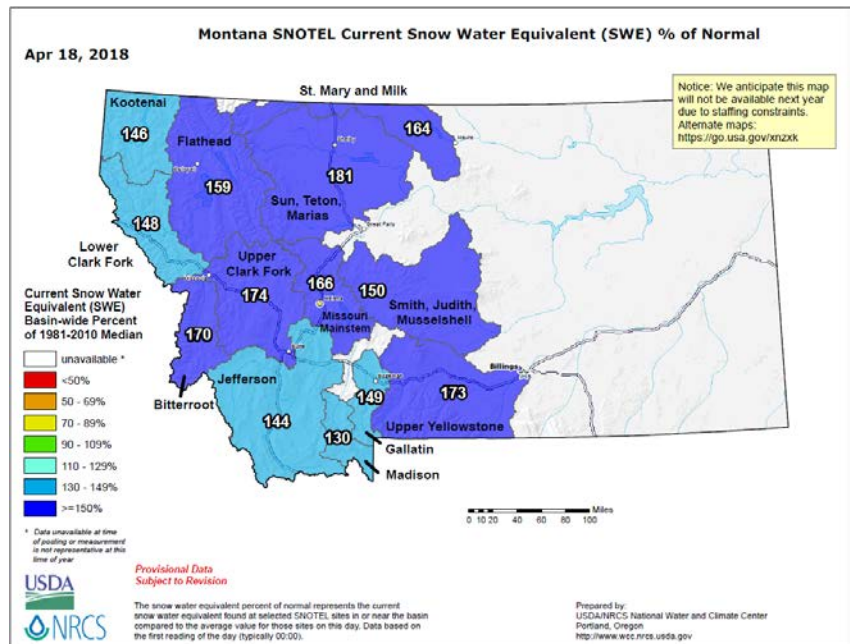
06023500	Big Hole River near Jackson MT	1.21	51.0	Ice	--
06023800	Big Hole River ab Spring Creek nr Jackson MT	2.07	88.0	41.2	--
06024020	Big Hole River at Miner Creek nr Jackson MT	1.77	364	160	--
06024450	Big Hole River bl Big Lake Cr at Wisdom MT	3.15	382	413	2.3
06024540	Big Hole River bl Mudd Cr nr Wisdom MT	3.70	871	849	1.9
06024580	Big Hole River near Wise River MT	3.80	1,460	1,270	Ssn
06025250	Big Hole River at Maiden Rock nr Divide MT	4.13	1,429	1,480	Ssn
06025500	Big Hole River near Melrose MT	2.84	1,390	1,520	3.8
06026210	Big Hole River near Glen MT	3.48	1,409	1,640	Ssn
06026420	Big Hole R bl Hamilton Ditch nr Twin Bridges, MT	--	---	--	Ssn



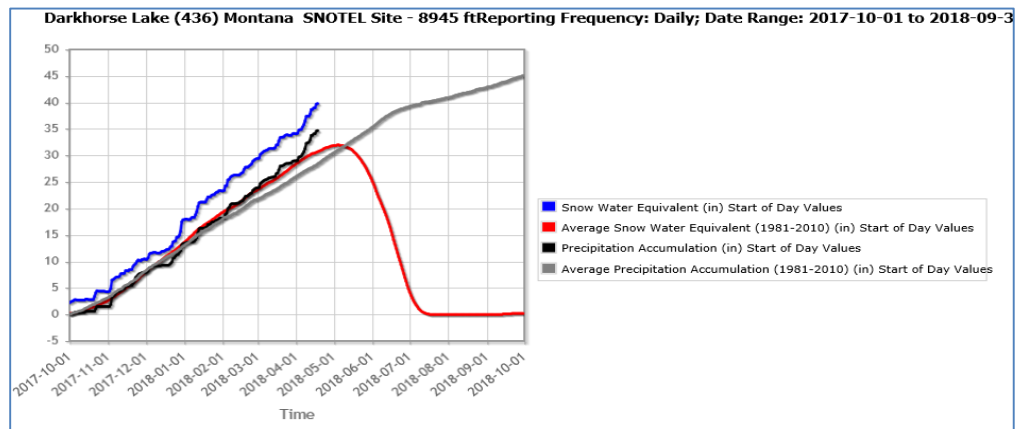
- Snowpack:** At this time the Big Hole Basin is at 149% of average. The Jefferson Basin in its entirety is at 144% of average. The snowpack is holding strong and all SNOTEL sites are well above average with occasional continued augmentation from the winter that does not want to end. With long-range forecasts indicating little change to the cool and wet pattern that has persisted throughout this winter, some additional SNOTEL records may fall as we reach peak snowpack this spring in Montana's river basins.

		18-Apr 2017	18-Apr 2018	1981-2010 median	2018
<u>Station</u>	<u>elevation</u>	<u>inches</u>	<u>inches</u>	<u>inches</u>	<u>% avg</u>
Barker Lakes	8250	14.1	22.3	15.4	145
Basin Creek	7180	6.5	12.3	8.7	141
Bloody Dick	7600	16.2	18	10.4	173
Calvert Creek	6430	1.9	10.1	4.9	206
Darkhorse Lake	8600	33.4	39.8	28.9	138
Moose Creek	6200	11	20.2	14.2	142
Mule Creek	8300	18.4	24.2	15.6	155
Saddle Mtn.	7940	25.1	35.6	24	148
TOTAL		126.6	182.5	122.1	
BASIN AVERAGE %			149		

- Precipitation:** Snowfall and precipitation favored the southwest portion of the state over the course of March; moist southwest flow dropped above normal precipitation in the mountains and valleys over the Jefferson River basin. Although it is now officially spring, April and May are both significant for the basin snowfall and precipitation wise and will play a critical role in determining the timing and magnitude of runoff this spring and summer. Hopefully, the wet and cool pattern will persist.

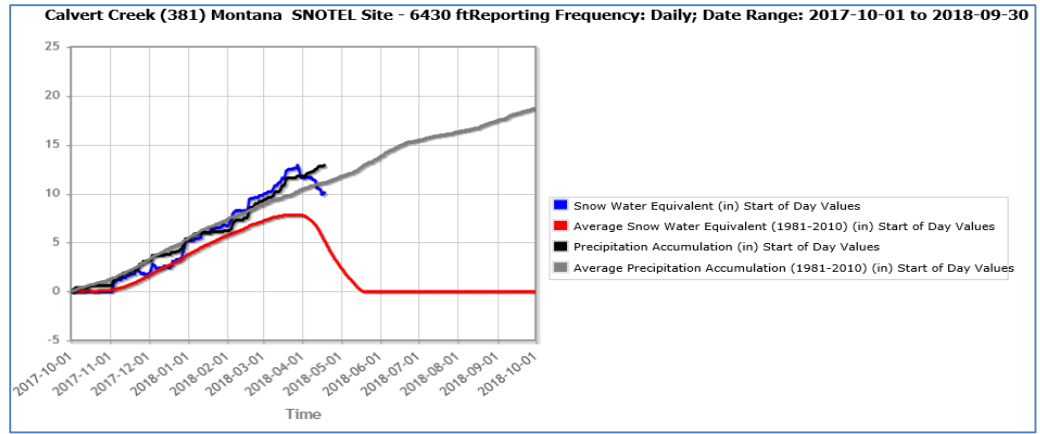


- Temperatures:** Valley air temperatures for April have been below normal with average highs fluctuating a few degrees above and below the average. The outlook for the remainder of the month is similar below average temperatures.



- Forecast:** The La Nina advisory issued over the winter is still in effect and will likely last until mid-May now before we transition to ENSO-neutral

conditions that are expected to last through the northern hemisphere summer. La Nina conditions did weaken somewhat during March but as we are still in the thick of it forecasters are struggling to predict conditions beyond this summer until we fully return to ENSO-neutral.



- *The three-month outlook:* Currently favors normal to slightly above average precipitation depending on the flow of incoming weather systems through the rest of the spring and a continuation of the average to below average temperatures we've seen over the last month.

Drought Management Plan – Randy Smith, BHWC Chairman

- The 2018 DMP will be same as the 2017/2016 version.
- Stream gauge issue. Funding is being pulled by state agencies. All gauges are funded through 2018 but funding is uncertain in 2019. Senator Welborn reserved us a spot to testify before the Water Policy Legislative Committee in May. BHWC may have to prioritize gauges in the future if funding is not available to support all of the existing gauges.

Director's Report – Randy Smith, BHWC Chairman

- Jen is dealing with the passing of her husband and is currently taking a leave of absence.

Steering Committee – Randy Smith, Chairman; Roy Morris, Secretary

- Steering Committee is happy with the progress BHWC is making.

Wildlife Report – Jim Hagenbarth, BHWC Vice-Chairman and Tana Nulph, BHWC Conservation Programs Coordinator

- Carcass Removal: Currently available free-of-charge. Offered through mid-May 2018 to upper Big Hole livestock producers. *Flier with contact information attached.*
- Sage Creek Carcass Removal in partnership with CVA: BHWC is partnering with the Centennial Valley Association spring 2018 to provide spring carcass removal at Sage Creek. Sage Creek carcasses are taken to the Beaverhead County Landfill.
- Regional Conflict Reduction Coordination Initiative: BHWC is a member along with 9 other groups. Initiative secured funding from the National Fish and Wildlife Foundation. Now hiring a coordinator to manage the grant and coordinate conflict reduction efforts throughout Western Montana.
- Wildlife Speaker Series: 2018 event to be held Wednesday, July 25, 6pm at the Wise River Community Building. Topic: Western Pearlshell Mussels presented by Dave Stagliano, Montana Biological Survey
- Road Use Working Group meeting at Dillon March 13th – Jim attended. There were several hunters there and there may be an opportunity for this group to work with the Hunter Advancement program. Hunters need to help out ranchers by keeping an eye out, monitoring for poaching, etc. and communicating effectively with ranchers. There is a 2nd meeting tonight (April 18th), and Jim is also attending that meeting.

People & Land Use Planning Report – Pedro Marques, BHWC Restoration Programs Manager

- None.

Restoration Projects Report – Pedro Marques, BHWC Restoration Programs Manager

- French Creek habitat restoration project – continuing to restore the creek, fixing 12 ft. high sagebrush banks that are collapsing into the stream. This is a huge sediment producer.
- East Divide Creek

New Business

- None

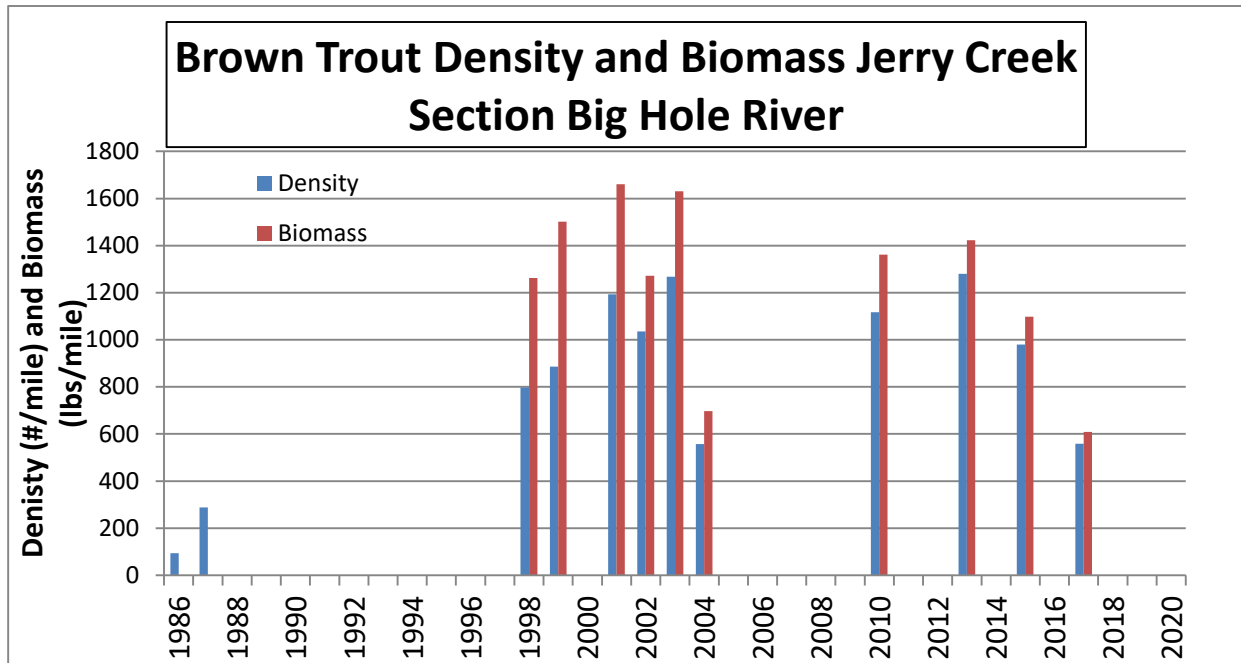
Meeting Topic 1: Big Hole Watershed Fishery Update

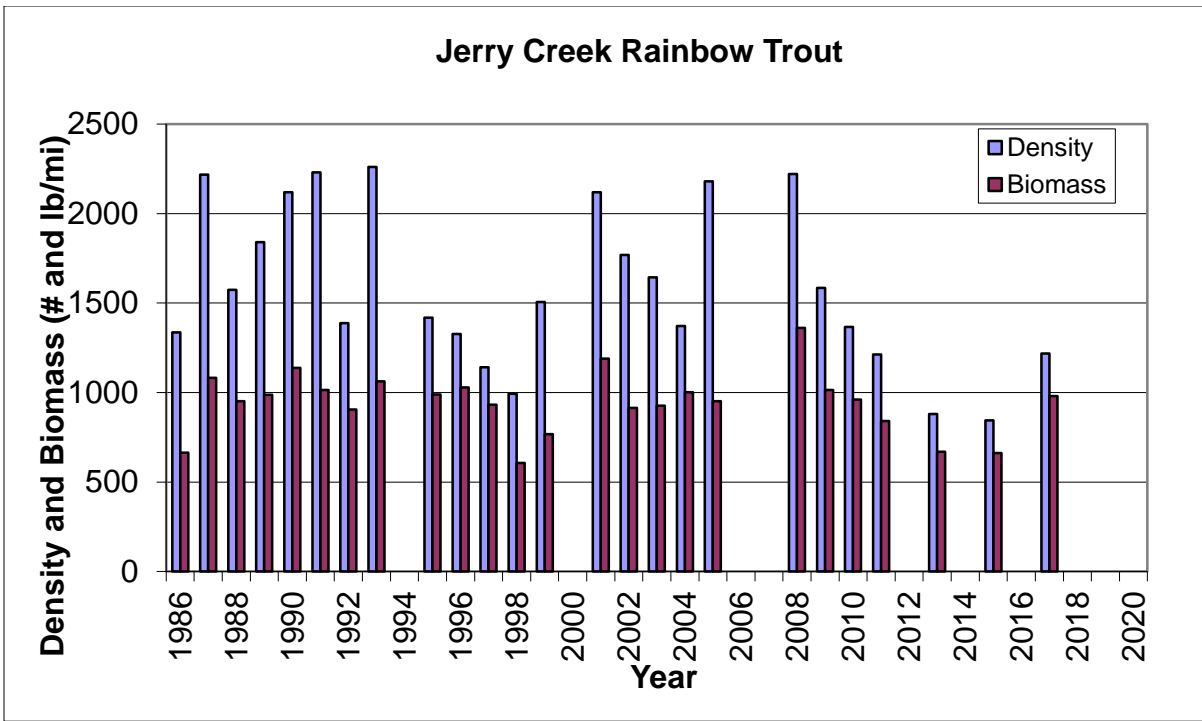
Presentation by: Jim Olsen, Montana Fish, Wildlife and Parks

Background: Jim Olsen is a Fisheries Biologist for Montana Fish, Wildlife and Parks. Jim conducts fish population surveys, works to restore Arctic grayling to Big Hole tributaries using streamside incubators, and supports restoration projects that enhance habitat for native fish species like Arctic grayling and Westslope Cutthroat trout.

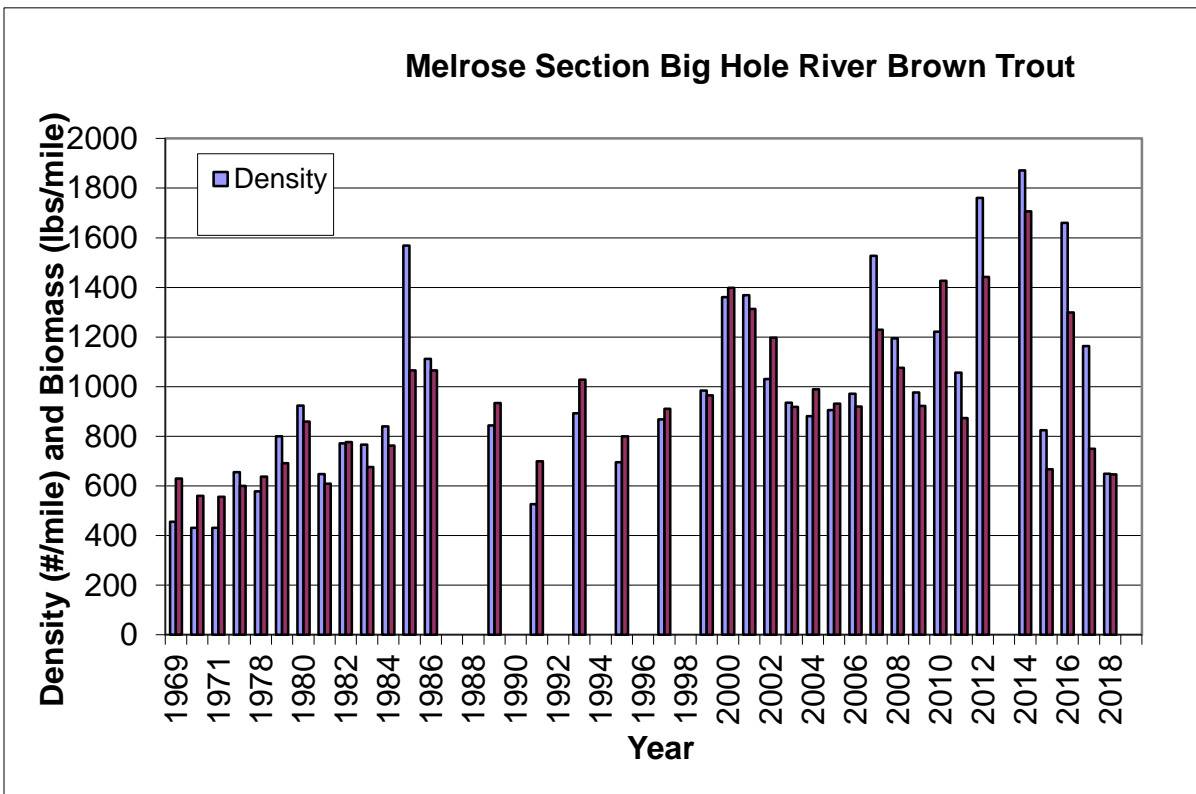
Big Hole River Fish Populations

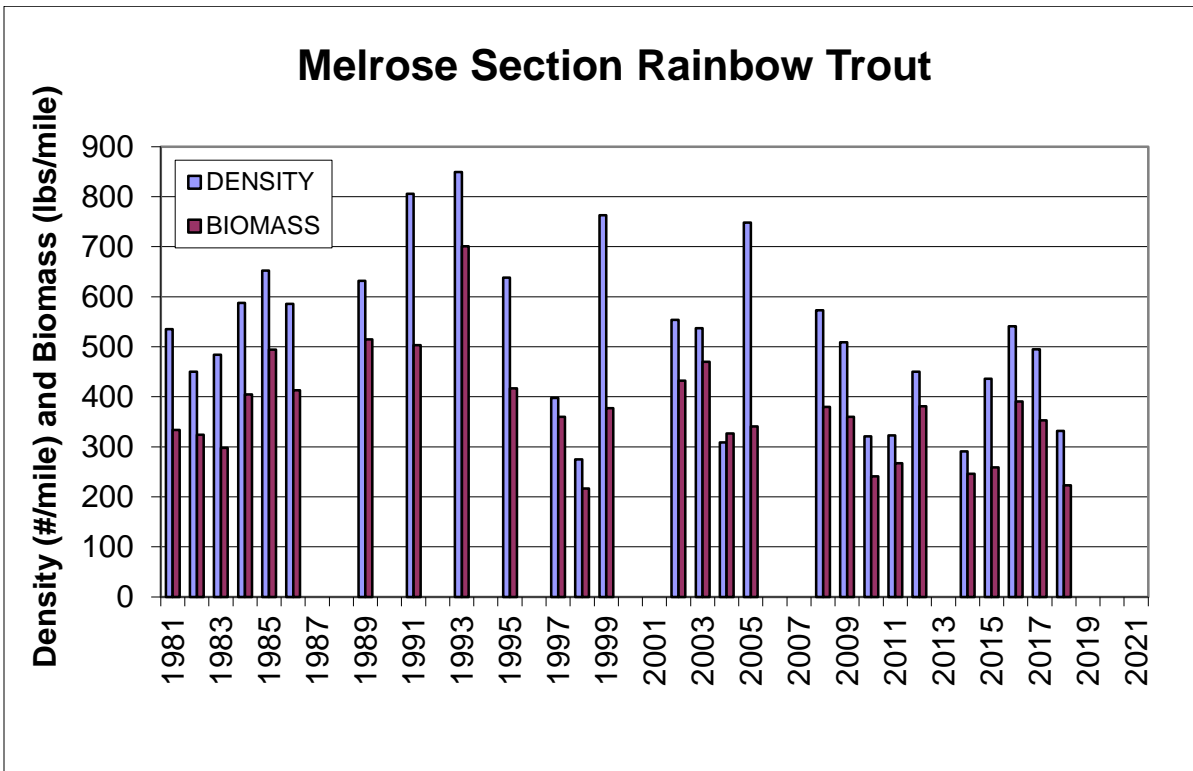
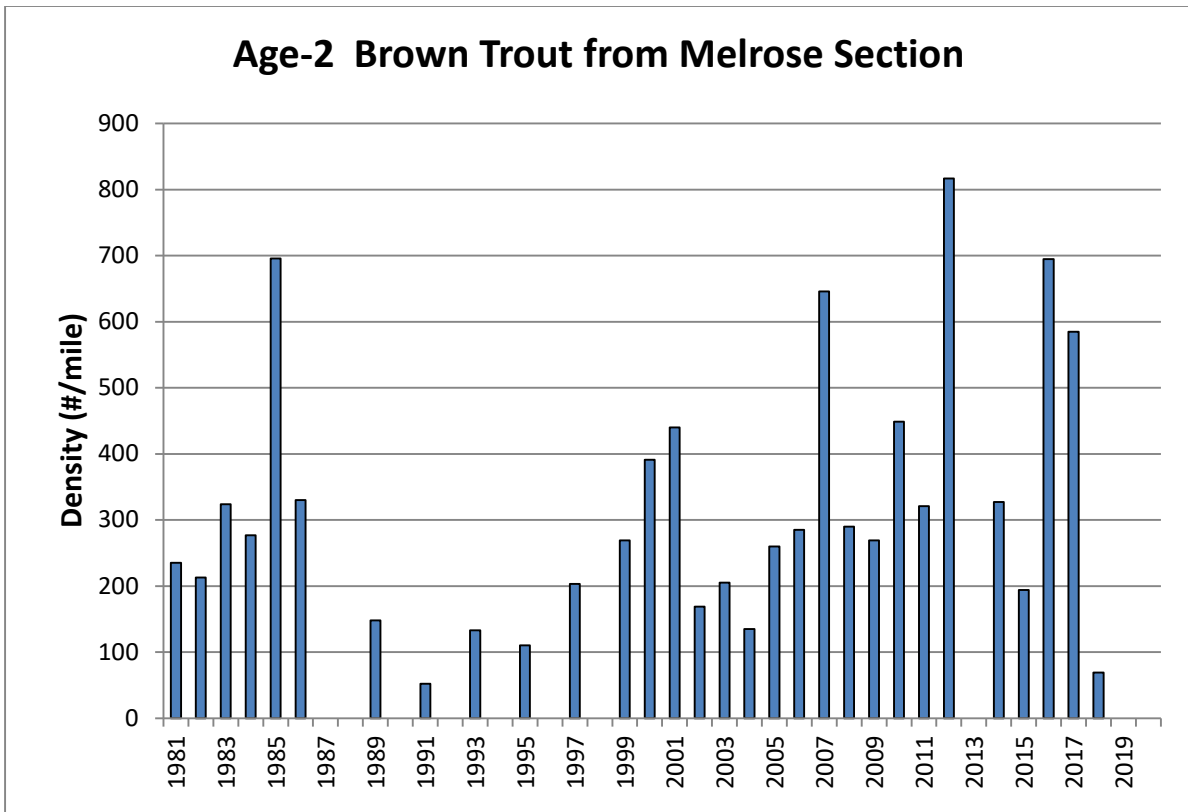
- Note – 2017 fish counts may be skewed due to changes in the river (flow increase) that occurred between the original count and the recapture count.
- Jerry Creek:
 - Brown trout numbers have increased since 1998, but have decreased recently, likely due to the *Saprolognia* fungus outbreak.
 - Rainbow trout numbers have increased.





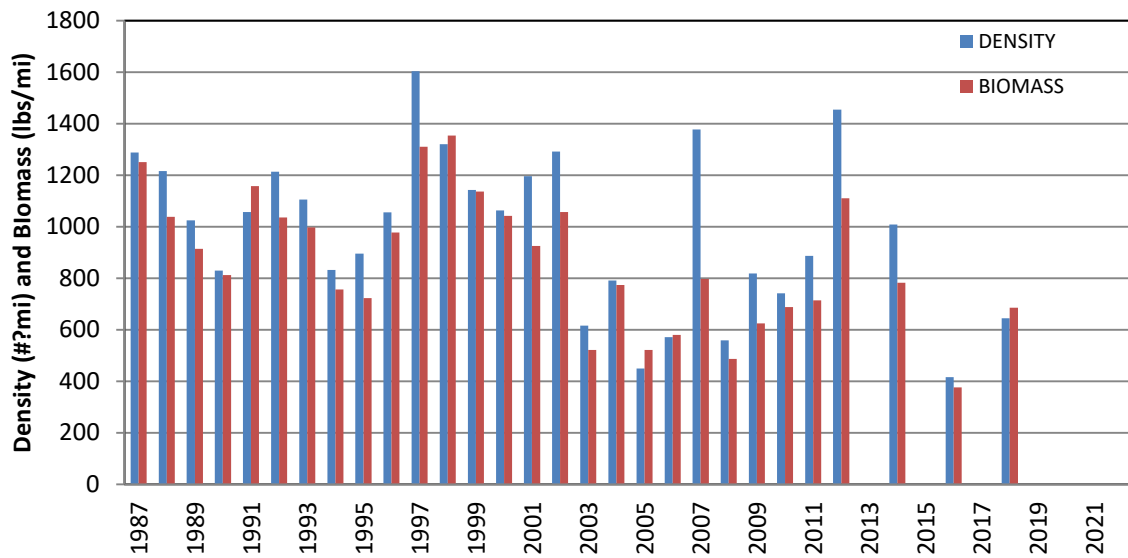
- Melrose:
 - Brown trout experienced a dramatic decline in the Melrose section this year. The river melted in July and then froze again, causing an ice jam that may have pushed the fish out of the section or caused some local mortality. There are a lot of 13-15 in. fish in the Big Hole right now; these are likely fish that survived the fungus outbreak.
 - Rainbow trout have been depressed in their abundance since the Whirling Disease outbreak in the early 1990s. About 2/3 of previous population remains. Melrose continues to be our hot spot for Whirling Disease.



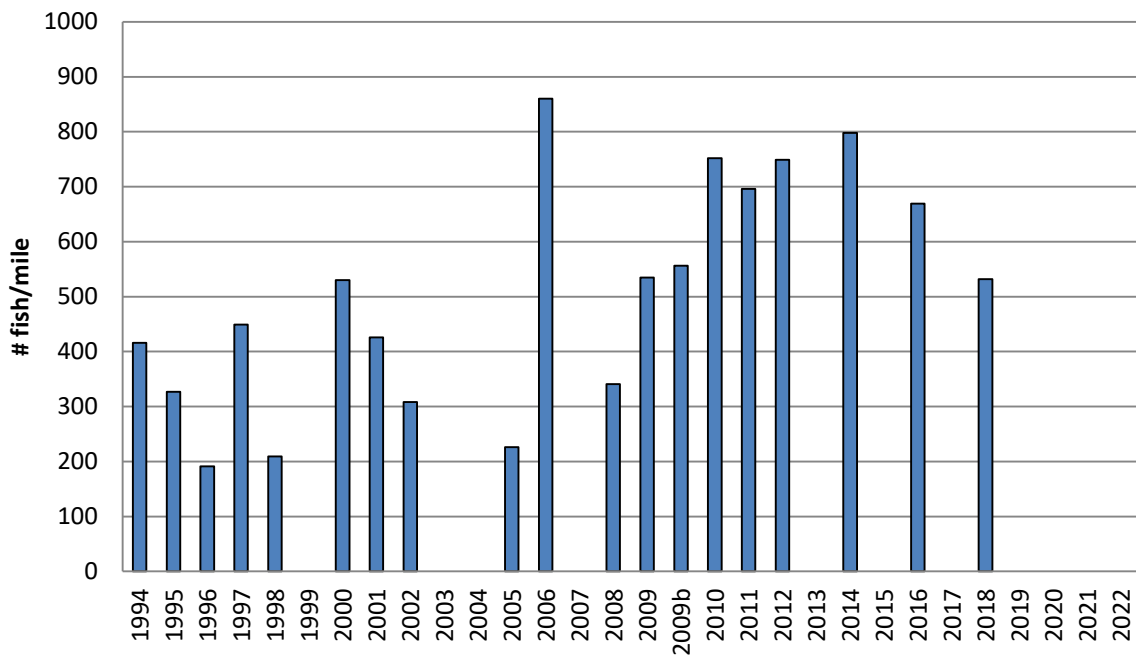


- Hogback:
 - As water starts to get low, brown trout take the biggest hit. This is the section in which we see response to drought more than any other section that's monitored.
 - Question:
 - How long is that section?
 - About 3 miles of river. That's about the most we can do in a day.

Brown trout Hogback Section Big Hole River

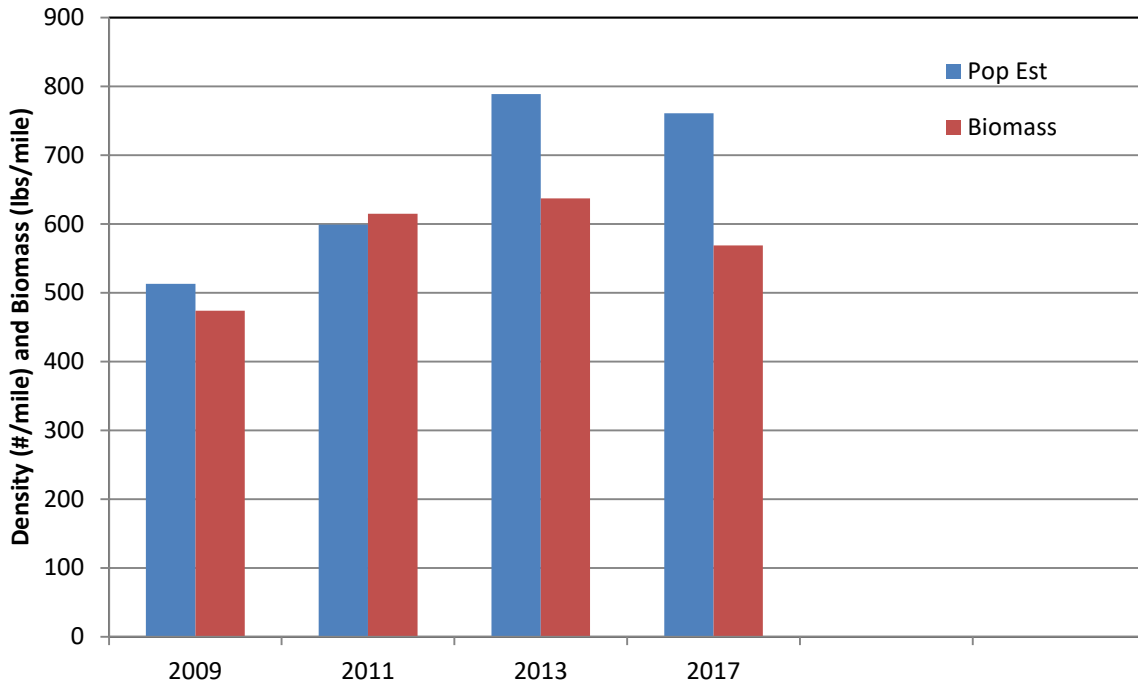


Rainbow Trout Hogback Section Big Hole River

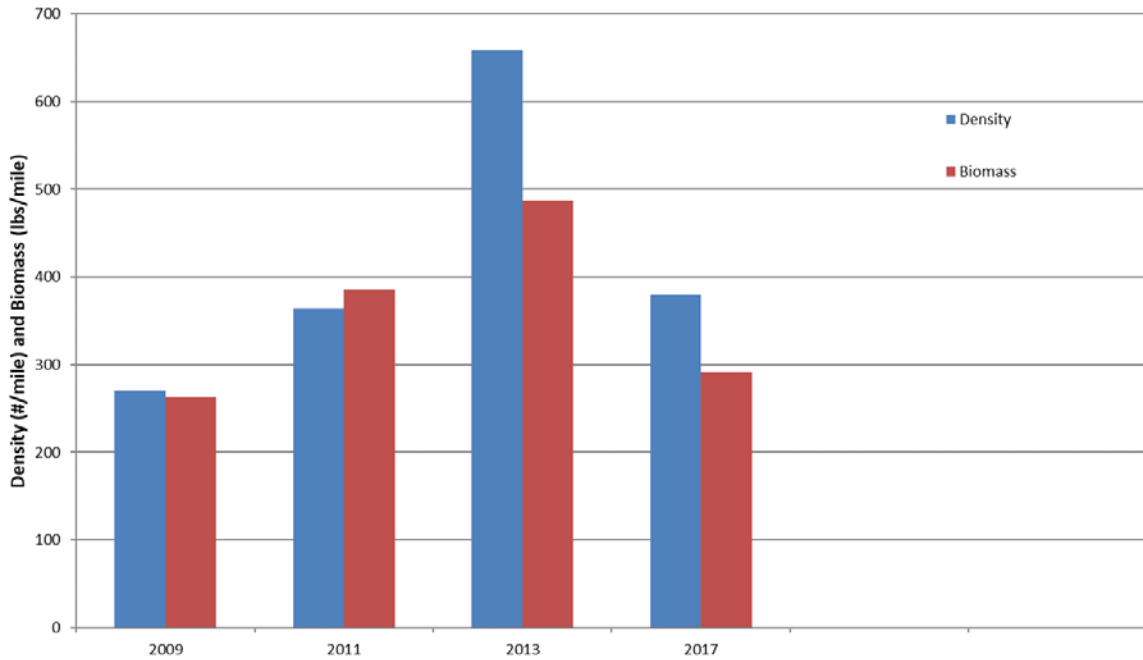


- Pennington Section:
 - No tributaries so no tributary spawning.
 - Density of fish is really low in this reach, so rainbow and brown trout counts are combined.
 - Fish grow really fast here, probably due to less competition and warmer water temperatures.

Combined Brown and Rainbow Trout from Pennington Seciton



Age 2 + Brown Trout Pennington Section Big Hole River



Restoration Projects

- Childrey-Halladay: Just before the river flows into the Notch. Slough system. Deep water discharge from 14 ft. below bottom of pond, feeds into slough channel. Restoration work: installed siphon under slough system to discharge slough system water to the Big Hole River. Small system, 1-10 cfs (higher during irrigation). Enhancing fish habitat. System was over-widened- narrowed with sod. Introduced spawning gravel, shallow pools to provide habitat for juvenile fish. Introduced rainbow trout system. Stay in the slough for a year, swim into the river, return to slough channel around year 3 to spawn. First year had an issue with the incubator and all of the fish died. Now “not putting all their eggs in one basket”. Took eggs from 8 females. Eggs hatch out into yolk-sac fry. They lay in the incubator (or gravel streambed, in the wild), absorb the yolk sacs, and grow. One incubator was successful (~95% survival – about 5,000 fry), upstream incubator experienced 80-90% mortality, likely due to high sediment which clogged gills & asphyxiated fry. A reminder of the importance of water quality for developing fish, especially at this stage. Discovered water at the bottom of the pond is much more turbid than water on the top of the pond – this year, will try using water from the top of the pond to see if it increases fry survival. Fish are already coming in and spawning here.
 - *Question: If fish spawn there naturally, will you see the same problem with the fry?*
 - *The issue is that we’re pumping water from the bottom of the pond, and that has high turbidity and potentially low oxygen. We’re going to try pumping water from the top of the pond and see if that results in higher fry survival. If it does, we’ll keep doing that each year. We are monitoring the bottom of the pond to determine oxygen content.*
 - *Doesn’t cold water hold more dissolved oxygen than warm water?*
 - *That is correct usually, but groundwater is often low in oxygen. The water is cold, but that doesn’t matter if it doesn’t have enough dissolved oxygen.*
- Smith Slough: Working with landowners to create a 2-channel slough system. Have ~15cfs water right, 1 pivot that runs ~3 cfs. The remaining ~12 cfs stays in the slough system for spawning.
 - *Question: Is that public water? Can we fish that?*
 - *I don’t know. Probably not.*

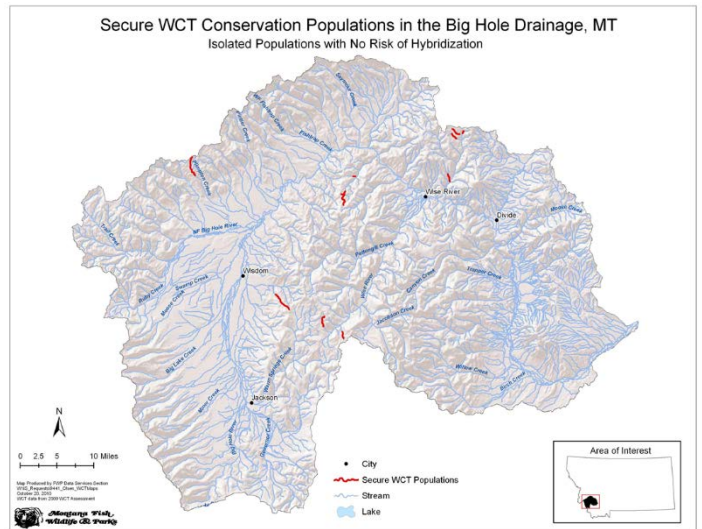
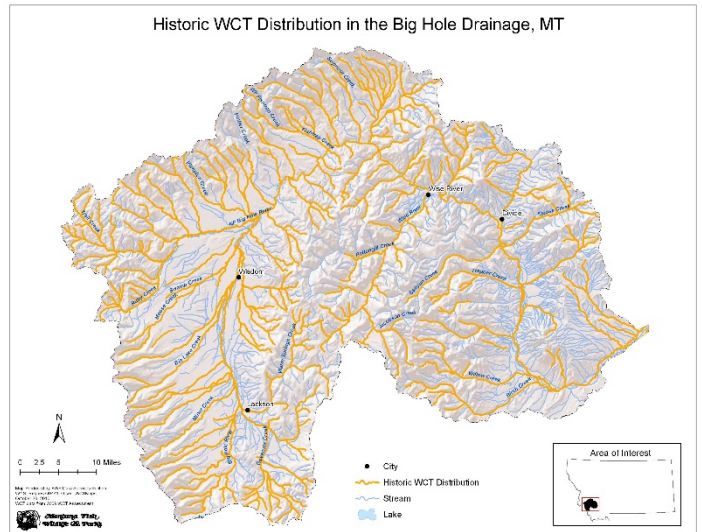
Native Fish Restoration

- Why should we care about native fish? (Benefits of native species restoration)
 - Conserve unique fish for future generations
 - Fulfill State’s obligation to conserve native species and not let them be listed under the Endangered Species Act.
 - As good stewards of the land and its resources we should do what we can to conserve species.
 - Aldo Leopold said: “The key to intelligent tinkering is to never get rid of any of the parts.”
- Arctic grayling:
 - Reintroducing grayling to Wise River & Trail Creek
 - Incubators set up on Wise River:
 - Little Joe Creek
 - Wyman Creek
 - Spawn fish from Axolotl Lake near Ennis
 - Put ~100,000 eggs in Streamside Incubators annually
 - Haven’t seen a lot of success within a mile downstream of incubators – not sure where they’re going.
 - Taking grayling from Mussigbrod and Miner Lakes to Twin Lakes and Van Houten Lake
 - Twin Lakes also has native Lake Trout.
 - *Discussion:*
 - *Have you actually seen them?*
 - *Yes, we caught a bunch of them – lots of little ones and several big ones too.*
 - *How many years are you going to do grayling egg introductions?*
 - *We said we’d do 4 and this will be our 4th year. So possibly this will be the last year.*

- *Are the lake trout doing so well because they're eating the grayling fry?*
 - *We don't know yet, typically we monitor with gill nets but we haven't done that in Twin Lakes yet because we don't want to kill any lake trout. We haven't heard any reports of anyone catching grayling there. We're also stocking it with 2" cutthroats each year.*

- **French Creek:**

- French Creek is being restored to provide habitat for native fish, including Arctic grayling and Westslope cutthroat trout.
- The Big Hole is the last fluvial (river dwelling) population in lower 48 states.
- Nowhere in their native range do they exist where there are no nonnative fish present.
- **Why French Creek?**
 - Over 40 miles of habitat
 - 98% on public property – a native fishery for everyone to enjoy
 - High quality habitat that is improving
 - Natural healing
 - Good land management
 - Habitat restoration
 - 2 native cutthroat populations in the drainage will be conserved and expanded (American Creek and Sixmile Creek)
 - Conserve native Pearlshell mussels (need native fish & high quality water to survive and reproduce)
- **How will restoration occur?**
 - Need fish barrier to keep nonnatives out
 - Remove nonnative trout over 2-3-year period using rotenone
 - Restore native Arctic grayling and Westslope Cutthroat trout
- **Fish Barrier:**
 - **Why this location?**
 - In order to install a fish barrier, you need a location that is narrow and confined. This is really the only suitable site in the whole drainage for a fish barrier.
 - Engineered and overseen by Pioneer Technical
 - Built many similar barriers including one on Silver Bow Creek
 - Earthen dam with concrete spill way:
 - Designed to prevent fish passage up to 50-year flood (636 cfs) and pass 100-year flood (721 cfs).
 - Spillway 10.3 ft., total height is 15 ft.
 - Riprap capacity is 998 cfs, 500-year flood is 9278 cfs
 - Impounds 12.5 acre-feet of water (50 acre feet is the minimum to be considered a high hazard dam)



- Cherry Creek example: (Cherry Creek barrier is 8 ft. wide, French Creek barrier will be 30 ft. wide)

Fish Removal with Rotenone

- Extracted from a South American plant (in South America, the native people use rotenone to catch fish to eat – fish float to the surface and are shot with bows).
Very effective on fish at low concentration (50 ppb)
- Takes ~24-48 hours to dissipate in streams
- Can be neutralized at fish barrier.
- Has no effect on plants, other animals, or animals that eat treated fish.
- *Discussion:*
 - *Is there any effect on mussels?*
 - *We did study on that and found no effects. The study showed that mussels similar to the Pearlshell mussel are about 30x more tolerant to rotenone than fish.*
 - *How do mussels move upstream?*
 - *They don't, except during the reproductive phased. They parasitize the gills of fish and inject spores into them, which are shed at a later date.*

Restocking of Fish

- Restore native Arctic grayling and Westslope cutthroat trout
 - Stock eggs and fry over 3-4-year period
 - Stock catchable size WCT and potentially grayling
- Also Rocky Mountain sculpin, longnose dace, mountain whitefish, longnose sucker

Where are we in the process?

- Put barrier out to bid fall 2017
 - Got 2 bids, \$120k more than what FWP had secured
- Scrutiny of the project tin fall 2017 resulted in flood study
- Fundraising (raised an additional \$65K)
- Issues Supplemental EA (Comment period ends April 30th)
- Public Meeting: 4/26/18 at 6:30 at Copper King Hotel in Butte
- Decision in May
- If moving forward, barrier construction will occur summer/fall 2018
- Begin fish removals in 2019

Does It Work?

- | | |
|---|--|
| <ul style="list-style-type: none"> • Cherry Creek • McVey Creek • N Fork Doolittle Creek • W Fork Mudd Creek • York Gulch • Sixmile Creek • Pintler Creek • Van Houten Lake | <ul style="list-style-type: none"> • Schultz Creek • Bender Creek • Long Branch Creek • Total of 67 miles of stream and 3 lakes restored • Other secured native populations: 20.5 miles • Total is 87.5 miles of stream (French Creek: 40 miles) |
|---|--|

Discussion:

- *How much cfs will return to the river now that this area has been restored?*
 - *10 cfs potentially*
- *Is this type of project going to be expanded to where nonnatives are removed from the entire Big Hole River (or other tributaries like La Marche Creek or North Fork BHR) and replaced with native fish?*
 - *No, the long-term goal is to restore cutthroat to 20% of their historic range, and a fish barrier has to be in place in order to restore native fish because otherwise nonnatives will out-compete and predate them. There are not very many places that are suitable to install a fish barrier.*

This part of French Creek is basically the only place in this drainage that's suitable for a fish barrier, because it's a narrow canyon.

- *How short were we on the bid?*
 - *We have obtained about \$60k, we have another \$40k that we think we'll be able to obtain, and that should put us pretty close to our goal so hopefully we can get some bids that are within our budget.*

Meeting Topic 2: Earthen Dam Breach Failure Analysis

Presented by: Kim Snodgrass, Water and Environmental Technologies

Background: Last fall, Montana Fish, Wildlife and Parks held a public meeting in Wise River to discuss the proposed fish barrier on French Creek. Local residents had some questions and concerns, particularly in regards to what would happen if the structure were to breach and flood; as a result, Water & Environmental Technologies conducted a study to analyze the effects of potential dam breaches under various scenarios.

Location & Purpose of the Fish Barrier:

- Narrow canyon of French Creek is ideal location for barrier
- Earthen Dam
 - Armored embankment
 - Elevation 5911.93 ft.
- Concrete Spillway/Weir
 - 30 feet wide, 1.75 feet tall, weir crest 5907.19 feet
- Protect 40 miles of stream habitat
 - Part of the remediated and restored basin

Floodplain Regulations:

- Zone A FEMA Floodplain
 - Fish barrier must comply with FEMA, DNRC, and local Floodplain Administrator requirements.
 - Residential development constructed to be reasonably safe from flooding.
- Pioneer Technical Role
- Water & Environmental Technologies
 - Looked at lateral movement, downstream movement, etc.

Hydraulic Model & Topographic Surface

- What is a hydraulic model?
 - A series of calculations to determine the route water will take across a given ground surface
 - One-dimensional model
 - Two-dimensional model
- Topographic surface
 - Ground surveys
 - 10-meter accuracy elevation dataset
 - French Creek geometry superimposed into surface
 - Fish Barrier superimposed into surface
 - Topographic Surface Development

Breach Calculations – Earthen Dam Failure

- Overtopping Breach Scenario (What would happen in the worst case scenario?)
 - 15.5 feet high
 - 37 feet wide, trapezoid
 - Complete failure within 15 minutes
- Other Hydraulic Model Scenarios:
 - Low flow (19 cfs) with fish barrier

- Low flow (19 cfs) with fish barrier and earthen dam failure
- High flow (724 cfs) with existing conditions
- High flow (724 cfs) with fish barrier
- High flow (724 cfs) with fish barrier and earthen dam failure

Scenario: Catastrophic event – 100-year storm event

- Complete blockage of the concrete spillway (ice jam)
- Reservoirs filled to height of dam (5911.93 feet)
- Zero sediment retention behind the weir (5907.19 feet)
- Peak flow of 724 cubic feet per second and 590 cfs vs. 724 cfs
- Complete earthen dam failure during peak flow (722.8 cfs)
- Results at two structures downstream from proposed barrier:
 - Use hydraulic model to see what would happen to water elevation through transects drawn through downstream structures.
 - Upstream home:
 - 1.08 feet rise (13 inches)
 - Downstream home:
 - 0.85 ft. rise (10.2 inch rise) above 100-yr event
 - Water comes out and fans across floodplain
- In conclusion: Even in the worst case, 100-year flood scenario, each of the 2 homes near the dam would receive only 10-13 inches of water, so it wouldn't be some catastrophic event washing away homes and property.

Discussion:

- *Has that been compared to the Pattengail breach?*
 - *No, but the Pattengail was probably about 50 feet higher than the proposed French Creek barrier. This is very small in comparison, and we hope within 5 years it will fill up with sediment and it will just be a waterfall flowing downstream.*

Upcoming Meetings

- May 16, 2018, 7pm @ the Divide Grange – BHWC Monthly Meeting. *Topic: Invasive Weeds in the Big Hole Watershed. Presented by representatives from local counties, state & federal agencies, and private companies.*
- June 20, 2018, 7pm @ the Divide Grange – BHWC Monthly Meeting. *Topic: Big Hole Watershed Wildlife Update. Presented by Vanna Boccadori and Craig Fager with Montana Fish, Wildlife and Parks.*

Adjourn